REMARKS

Claims 1, 3 and 6 through 9 are amended. Thus, claims 1 through 6 are presented for examination as amended.

Claims amendments have been made to eliminate element numbering and multiple dependencies and correct typographical errors. No new matter is added by the changes made herein.

Respectfully submitted,

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Title: METHOD FOR COMPENSATION FOR A ZERO ERROR IN A CORIOLIS GYRO

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BACKGROUND

Field of the Invention

The present invention relates to Coriolis gyros. More particularly, this invention pertains ~~The invention relates~~ to a method for compensation for a zero error in a Coriolis gyro.

Description of the Prior Art

Coriolis gyros (also referred to as "vibration gyros") are in increasing use for ~~being used increasingly for~~ navigation. ~~purposes.~~ They possess ~~Coriolis gyros have~~ a mass system that ~~which~~ is caused to oscillate with the ~~This~~ oscillation ~~is~~ generally being a superimposition of a large number of individual oscillations.

The ~~These~~ individual oscillations of the mass system are initially independent of one another and can ~~each~~ be referred to abstractly as "resonators". At least two resonators are required for operation of a vibration gyro: one ~~of these resonators~~ (the first

resonator) is artificially stimulated to oscillate, and this is referred to below ~~in the following text~~ as the "stimulating oscillation". The other resonator (the second resonator) is stimulated to oscillate only when the vibration gyro is moved/rotated. This is because Coriolis forces occur in this case, that ~~which~~ couple the first resonator to the second resonator, absorb energy from the stimulating oscillation for the first resonator, and transfer it ~~this~~ to the read oscillation of the second resonator. The oscillation of the second resonator is referred to below ~~in the following text~~ as the "read oscillation".

In order to determine movements (in particular rotations) of the Coriolis gyro, the read oscillation is tapped off and a corresponding read signal (e.g. ~~for example~~ the read oscillation tapped-off signal) is investigated to determine whether any changes have occurred in the amplitude of the read oscillation as they ~~which~~ represent a measure of the rotation of the Coriolis gyro.

Coriolis gyros may be implemented as both open-loop ~~open-looped systems~~ and ~~as~~ closed-loop ~~closed-looped~~ systems. In a closed-loop system, the

amplitude of the read oscillation is continuously reset to a fixed value (preferably zero) by ~~via respective~~ control loops.

An ~~One~~ example of a closed-loop version of a Coriolis gyro will be described below in conjunction with ~~in the following text, with reference to~~ Figure 2, a schematic diagram of a Coriolis gyro in accordance with the prior art ~~in order to illustrate further the method of operation of a Coriolis gyro~~. The ~~A Coriolis~~ gyro 1 includes ~~such as this has~~ a mass system 2 that ~~which~~ can be caused to oscillate and is also referred to below ~~in the following text~~ as a "resonator". (A distinction exists ~~must be drawn~~ between this expression and the abstract "resonators" term previously employed for ~~mentioned above, which represent~~ individual oscillations of the "real" resonator. As ~~already~~ mentioned, the resonator 2 may be considered ~~regarded~~ as a system composed of two "resonators" (a ~~the~~ first resonator 3 and a ~~the~~ second resonator 4)). Each of ~~Both~~ the first and the second resonators ~~resonator~~ 3, 4 is ~~are each~~ coupled to a force sensor (not shown) and to a tapping system (not shown). The noise ~~which is~~ produced by the force sensors and the tapping systems is indicated

schematically ~~here~~ by Noise1 (reference symbol 5) and Noise2 (reference symbol 6).

The Coriolis gyro 1 includes ~~furthermore has~~ four control loops. A first control loop controls ~~is used to control~~ the stimulating oscillation (that is to say the frequency of the first resonator 3) at a fixed frequency (resonant frequency). It comprises ~~The first control loop has~~ a first demodulator 7, a first low-pass filter 8, a frequency regulator 9, a VCO (voltage controlled oscillator) 10 and a first modulator 11.

A second control loop controls ~~is used to control~~ the stimulating oscillation at constant amplitude. It comprises ~~and has~~ a second demodulator 12, a second low-pass filter 13 and an amplitude regulator 14.

~~A~~ Third and ~~a~~ Fourth control loops ~~loop~~ are employed ~~used~~ to reset the ~~those~~ forces that ~~which~~ stimulate the read oscillation. ~~In this case,~~ The third control loop includes ~~has~~ a third demodulator 15, a third low-pass filter 16, a quadrature regulator 17 and a third modulator 22 while the fourth control loop

comprises ~~contains~~ a fourth demodulator 19, a fourth low-pass filter 20, a rotation rate regulator 21 and a second modulator 18.

The first resonator 3 is stimulated at ~~its~~ resonant frequency ù1. The resultant stimulating oscillation is tapped off, ~~is~~ phase-demodulated by means of the first demodulator 7, and a demodulated signal component is supplied to the first low-pass filter 8~~,~~ that ~~which~~ removes the sum frequencies. ~~from it.~~ (The tapped-off signal is also referred to below ~~in the following text~~ as the stimulating oscillation tapped-off signal.) An output signal from the first low-pass filter 8 is applied to a frequency regulator 9 which controls the VCO 10, as a function of the signal supplied to it, such that the in-phase component essentially tends to zero. ~~For this purpose,~~ The VCO 10 passes a signal to the first modulator 11, which ~~itself~~ controls a force sensor such that a stimulating force is applied to the first resonator 3. When ~~If~~ the in-phase component is zero, ~~then~~ the first resonator 3 oscillates at its resonant frequency ù1. (It should be noted ~~mentioned~~ that all of the modulators and demodulators are operated on the basis of ~~this~~ resonant frequency ω1.)

The stimulating oscillation tapped-off signal is also applied ~~supplied~~ to the second control loop and ~~is~~ demodulated by the second demodulator 12. The ouput of the second demodulator 12 ~~whose output~~ is passed to the second low-pass filter 13~~,~~ whose output ~~signal~~ is, in turn, applied ~~supplied~~ to the amplitude regulator 14. The amplitude regulator 14 controls the first modulator 11 in response to ~~as a function of~~ this signal and the output of a nominal amplitude sensor 23 to cause ~~such that~~ the first resonator 3 to oscillate ~~oscillates~~ at a constant amplitude (i.e. ~~that is to say~~ the stimulating oscillation has ~~a~~ constant amplitude).

As ~~has already been~~ mentioned above, Coriolis forces (indicated by the term FC·cos(ω1·t) in Figure 2) ~~the drawing -~~ occur on movement/rotation of the Coriolis gyro 1. They ~~which~~ couple the first resonator 3 to the second resonator 4, and thus cause the second resonator 4 to oscillate. A resultant read oscillation of ~~at the~~ frequency ω2 is tapped off and ~~so that~~ a corresponding read oscillation tapped-off signal (read signal) is supplied to both the third and the fourth control loops. ~~loop.~~ This signal is demodulated in the third control loop by the third demodulator 15, sum frequencies are removed by the third low-pass

filter 16, and the low-pass-filtered signal is supplied to the quadrature regulator 17. The ~~whose~~ output of the quadrature regulator 17 ~~signal~~ is applied to the third modulator 22 ~~so as~~ to reset corresponding quadrature components of the read oscillation. Analogously, ~~to this,~~ the read oscillation tapped-off signal is demodulated in the fourth control loop by the fourth demodulator 19, passed ~~passes~~ through the fourth low-pass filter 20, and the ~~a correspondingly~~ low-pass-filtered signal then ~~is~~ applied ~~on the one hand~~ to the rotation rate regulator 21 (whose output ~~signal~~ is proportional to the instantaneous rotation rate and ~~is~~ passed as a rotation rate measurement ~~result~~ to a rotation rate output 24) and ~~on the other hand~~ to the second modulator 18 that ~~which~~ resets corresponding rotation rate components of the read oscillation.

A Coriolis gyro 1 as described above may be operated in both ~~a~~ double-resonant ~~form~~ and ~~in a~~ non-double-resonant forms ~~form~~. When ~~If the Coriolis gyro 1 is~~ operated in a double-resonant form, ~~then~~ the frequency ω2 of the read oscillation is approximately equal to that ~~the frequency~~ of the stimulating oscillation (ω1). ~~while, in contrast,~~ In the non-double-resonant case, the frequency ω2 of the read

oscillation <u>differs</u> ~~is different~~ from ~~the frequency~~ ω1. ~~of the stimulating oscillation.~~ In ~~the case of~~ double resonance, the output signal from the fourth low-pass filter 20 contains corresponding information about the rotation rate. ~~while,~~ In contrast ~~in the~~ (non-double-resonant case), the output signal from the third low-pass filter 16 <u>contains the rotation rate information</u>. In order to switch between the ~~different~~ double-resonant <u>and</u> non-double-resonant operating modes, a doubling switch 25 ~~is provided, which~~ selectively connects the outputs of the third and the fourth low-pass filter 16, 20 to the rotation rate regulator 21 and the quadrature regulator 17.

As a result of unavoidable manufacturing tolerances, ~~it is necessary to take account of~~ slight misalignments <u>exist</u> between the stimulating forces/resetting forces/force sensors/taps and the natural oscillations of the resonator 2 (<u>i.e.</u> ~~that is to say~~ the real stimulating and reading modes of the resonator 2). <u>Such misalignments must be taken into account as</u> ~~This means that~~ the read oscillation tapped-off signal is <u>otherwise</u> subject to errors. In <u>such</u> a situation ~~such as this,~~ the read oscillation tapped-off signal ~~is~~ thus <u>includes</u> ~~composed of~~ a part <u>that</u> ~~which~~

originates from the real read oscillation, and one that ~~of a part which~~ originates from the real stimulating oscillation. The undesired part causes a Coriolis gyro zero error of unknown ~~whose~~ magnitude as ~~however, is unknown, since~~ it is impossible to distinguish between these two parts when the read oscillation tapped-off signal is tapped off.

SUMMARY OF THE INVENTION

It is therefore an object of ~~the object on which~~ the invention ~~is based is~~ to provide a method for compensation for ~~which allows~~ the above-described zero error ~~described above to be determined~~.

~~This object is achieved by the method as claimed in the features of patent claim 1. The invention also provides a Coriolis gyro as claimed in patent claim 6. Advantageous refinements and the developments of the idea of the invention can be found in the respective dependent claims.~~

The present invention provides, in a first aspect, ~~According to the invention, in the case of~~ a method for compensation for ~~determination of~~ a zero error in ~~of~~ a Coriolis gyro. In such method, the

frequency ~~(preferably the resonant frequency)~~ of the read oscillation is modulated. The output signal from a rotation rate control loop or quadrature control loop for the Coriolis gyro is demodulated in synchronism with the modulation of the frequency ~~(resonant frequency)~~ of the read oscillation ~~in order~~ to obtain an auxiliary signal which is a measure of the zero error. A compensation signal is then produced and ~~is~~ passed to the input of the rotation rate control loop or quadrature control loop. ~~with~~ The compensation signal is ~~being~~ controlled so ~~such~~ that the magnitude of the auxiliary signal is as small as possible.

~~In this case, the expression "resonate", means the entire mass system of the Coriolis gyro that can be caused to oscillate, that is to say with reference to Figure 2, that part of the Coriolis gyro which is identified by the reference number 2.~~

In a second aspect, the invention ~~The invention also~~ provides a Coriolis gyro that includes ~~which is characterized by~~ a device for determination of ~~the~~ zero error. ~~of the Coriolis gyro, having:~~

Such device includes a modulation unit that

~~which~~ modulates the frequency of the read oscillation of the Coriolis gyro. A demodulation unit is provided that ~~which~~ demodulates the output signal from a rotation rate control loop or quadrature control loop ~~of the Coriolis gyro~~ in synchronism with ~~the~~ modulation of the frequency of the read oscillation ~~in order~~ to obtain an auxiliary signal that ~~which~~ is a measure of the zero error. ~~and~~ A control unit ~~which~~ produces a compensation signal and passes it ~~this~~ to the input of the rotation rate control loop or quadrature control loop. ~~with~~ The control unit controls ~~controlling~~ the compensation signal so ~~such~~ that the auxiliary signal is as small as possible.

~~The invention will be described in more detail in the form of an exemplary embodiment in the following text, with reference to the accompanying figures in which:~~

The foregoing and other features of the invention will become further apparent from the detailed description that follows. Such description is accompanied by a set of drawing figures. Numerals of the drawing figures, corresponding to those of the written description, point to the features of the invention with like numerals referring to like features

throughout both the drawing figures and the written description.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a ~~shows the~~ schematic diagram ~~design~~ of a Coriolis gyro in accordance with ~~which is based on the method according to~~ the invention;

Figure 2 is a ~~shows the~~ schematic diagram ~~design~~ of a ~~conventional~~ Coriolis gyro in accordance with the prior art;

Figure 3 is a vector diagram for illustrating ~~shows a sketch in order to explain~~ the interaction of the resonator, force sensor system and tapping system in a Coriolis gyro;

Figures 4a through ~~to~~ 4d are a set of vector diagrams for illustrating ~~show a sketch in order to explain~~ the forces and oscillation amplitudes for a Coriolis gyro at double resonance;

Figures 5a through ~~to~~ 5d are a set of vector diagrams for illustrating ~~show a sketch in order to explain~~ the forces and oscillation amplitudes for a

Coriolis gyro close to double resonance;

Figures 6a <u>through</u> ~~to~~ 6d <u>are a series of vector diagrams for illustrating</u> ~~show a sketch in order to explain~~ the method according to the invention at double resonance<u>; and</u>

Figures 7a <u>through</u> ~~to~~ 7d <u>are a series of vector diagrams for illustrating</u> ~~show a sketch in order to explain~~ the method according to the invention close to double resonance.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

~~First of all,~~ The general method of operation of a Coriolis gyro <u>is</u> ~~will be~~ explained ~~once~~ again <u>with reference to the vector diagrams</u> ~~on the basis~~ of Figures 3 to 5~~, in the form of a vector diagram illustration~~ (Gaussian number plane). The method <u>of</u> ~~according to~~ the invention <u>functions</u> ~~operates~~ only <u>at</u> ~~when is~~ essentially double resonance ~~present~~ <u>(</u>on average<u>)</u>. ~~The~~ Drawings <u>labeled</u> ~~which are annotated with~~ "close to double resonance" <u>illustrate</u> ~~show~~ the changed conditions when the situation of "close to double resonance" occurs as a result of modulation of the resonant frequency of the read oscillation.

The vector diagram of Figure 3 illustrates ~~shows, schematically,~~ a Coriolis gyro ~~to be more precise a~~ (system 40) comprising a resonator (not shown), a force sensor system 41 and a tapping system 42 ~~in a Coriolis gyro~~. Possible oscillations x (stimulation) and y (read) are also indicated. Such oscillations ~~which~~ are coupled to one another by Coriolis forces in the event of rotation ~~rotations~~ at right angle ~~angles~~ to the plane of the drawing. The x oscillation (complex; purely imaginary at resonance) is stimulated by an ~~the~~ alternating force with the complex amplitude Fx (in this case only the real part Fxr). The y oscillation (complex) is reset by an ~~the~~ alternating force of ~~the~~ complex amplitude Fy with the real part Fyr and the imaginary part Fyi. (The rotation vectors exp(i*ω*t) are omitted in each case).

Figures 4a to 4d illustrate the forces and oscillation amplitude for a Coriolis gyro at double resonance. That is, they show the complex forces and complex oscillation amplitudes for an ideal Coriolis gyro with the same resonant frequency for the x and y oscillations ~~(double resonance)~~. The force Fxr is controlled ~~so as~~ to produce a purely imaginary,

constant x oscillation. This is achieved by the ~~an~~ amplitude regulator 14 (which controls the magnitude of the x oscillation) and the ~~by a~~ phase regulator 10/frequency regulator 9 (which controls the phase of the x oscillation). The operating frequency ω1 is controlled so ~~such~~ that the x oscillation is purely imaginary (i.e., ~~that is to say~~ the real part of the x oscillation is controlled to be zero).

The Coriolis force during rotation, FC, is now purely real, since it ~~the Coriolis force~~ is proportional to the speed of the x oscillation. If both oscillations have the same resonant frequency, then the y oscillation, caused by the force FC, has the form illustrated in Figure 4d. If the resonant frequencies of the x and y oscillations differ slightly, then complex forces and ~~complex~~ oscillation amplitudes occur as illustrated ~~with the form as shown~~ in Figures 5a to 5d. In particular, this results in a y oscillation, stimulated by FC, as shown in Figure 5d.

When double resonance is present, the real part of the y tapped-off signal is zero. ~~but, in contrast,~~ It is not zero in the absence of double resonance. In both cases, with reset gyros, the

Coriolis force FC is zeroed by a regulator Fyr which compensates for FC. In the case of Coriolis gyros ~~which are~~ operated with double resonance, the imaginary part of y is zeroed by ~~means of~~ Fyr, and the real part of y is zeroed by ~~means of~~ Fyi. The bandwidths ~~bandwidth~~ of the two control processes are ~~is~~ approximately 100 Hz.

~~The method according to the invention will now be explained in more detail, using an exemplary embodiment, with reference to Figure 1.~~

Figure 1 is a schematic diagram of a Coriolis gyro in accordance with the invention. Parts ~~and devices which~~ corresponding ~~correspond~~ to those of the prior art gyro of ~~from~~ Figure 2 are annotated with the same reference symbols ~~in the drawings,~~ and ~~will~~ not again explained ~~again~~.

The ~~A~~ resetting Coriolis gyro 1′ of Figure 1 includes ~~is additionally provided with~~ a demodulation unit 26, a fifth low-pass filter 27, a control unit 28, a modulation unit 29 and a first multiplier 30 or, alternatively, a second multiplier 31. The modulation unit 29 modulates the frequency of the read oscillation

of the resonator 2 at ~~a frequency~~ ωmod. An output signal from the quadrature control loop is supplied to the demodulation unit 26. It ~~which~~ demodulates this signal in synchronism with the frequency ωmod ~~in order~~ to obtain an auxiliary signal. Should there be ~~If there is~~ any zero error (i.e. due, for example, to ~~that is to say~~ ~~if there are any~~ misalignments between the stimulating forces/resetting forces/force sensors/taps and the natural oscillations of the resonator 2) ~~then~~ the strength of the auxiliary signal will then vary ~~varies~~ as a function of the frequency of the read oscillation.

The auxiliary signal is supplied to the fifth low-pass filter 27, which produces a low-pass-filtered signal and supplies it ~~this~~ to the control unit 28. The control unit 28 employs ~~uses~~ the low-pass-filtered auxiliary signal to produce ~~as the basis for producing~~ a signal which is applied ~~emitted~~ to the first multiplier 30. This multiplies the signal emitted from the control unit 28 by a signal that ~~which~~ originates from the amplitude regulator 14 to control ~~for controlling~~ the amplitude of the stimulating oscillation.

A compensation signal, ~~which is~~ obtained from the multiplication process, is added to the input to the rotation rate control loop. The control unit 28 controls the signal supplied to the first multiplier 30 so ~~such~~ that the magnitude of the auxiliary signal is as small as possible. This corrects the zero error. ~~Furthermore,~~ The magnitude of the zero error can be determined by the compensation signal, which represents a measure of the zero error. Alternatively, the output signal from the control unit 28 can be supplied to the second multiplier 31, which multiples this signal by the stimulating oscillation tapped-off signal and adds a compensation signal, ~~which is~~ produced in this way, to the read oscillation tapped-off signal. (The expression "control unit" is not restricted to the control unit 28 but may also mean the combination of the control unit 28 and the first or second multiplier 30, 31).

The signal ~~which is~~ supplied to the demodulation unit 26 may alternatively be tapped-off at a different point within the control loops~~, as well~~.

The method of the ~~according~~ to invention ~~that has just been described~~ can also be illustrated ~~as~~

~~follows,~~ with reference to Figures 6a to 6d and 7a to 7d. The tap for the y oscillation (second resonator x2, 4) in general also "sees" a part of the x oscillation (first resonator x1, 3): a21*x. This produces ~~results in~~ a Coriolis gyro zero error (to ~~which must~~ be determined). Figures 6a through ~~to~~ 6d illustrate ~~show~~ the situation at double resonance, while Figures 7a through ~~to~~ 7d illustrate ~~show~~ the situation at close to double resonance. In both cases, the sum signal of the actual y movement and a21*x is "zeroed" by means of Fyi and Fyr. If a21 is not equal to zero, Fxr is not equal to zero when the rotation rate is zero (zero error). Fyi becomes zero only when double resonance is present. A quadrature bias results when there are discrepancies in the resonant frequencies.

~~The~~ Compensation for a21 is accomplished ~~now carried out,~~ according to the invention, as follows. The gyro is assumed to be at double resonance. The resonant frequency of the read oscillation (which can be electronically detuned) is modulated by the modulation unit 29 with a zero mean value (e.g. ~~for example at~~ 55 Hz). ~~and~~ The signal Fyi is demodulated by the demodulation unit 26 in synchronism when the

resetting control loops are closed. If a21 were zero, then Fyi would not vary with ~~the~~ frequency. That is, ~~to say~~ it changes only ~~in the situation~~ where a21 is not equal to zero. In the latter case, the low-pass-filtered, synchronously demodulated Fyi signal is not ~~equal to~~ zero. The demodulated signal is supplied to the control unit 28 (preferably in the form of software), which controls a factor a21comp (auxiliary variable). A controlled component of the x movement, a21comp*x, is tapped off from the signal at the y tap (preferably in software). The magnitude of <u>the</u> ~~this~~ component a21comp is controlled <u>so</u> ~~such~~ that the demodulated Fyi signal becomes zero. There is, therefore, no longer any x signal component in the signal from the y tap that has been cleaned in this way and the bias <u>due to</u> ~~caused by the~~ read cross-coupling disappears. At double resonance and with the same Q factors, ~~just~~ a cross-coupling regulator would zero the bias caused by the read cross-coupling on its own. This is <u>due to the fact that</u> ~~because~~ the modulation of Fxr also slightly modulates the amplitude of x. The sum of the force component of x in Fyr and the read component of x at the y tap is thus zeroed via the force cross-coupling regulator. The bias <u>therefore</u> ~~thus~~ disappears if the Q factor is the same.

~~Alternatively,~~ It is also possible to use noise to modulate the read oscillation. Appropriate synchronous demodulation of the noise component in the read signal is then employed. ~~used in a situation such as this.~~

One major discovery on which the invention is based is that the output signal from the rotation rate control loop/quadrature control loop changes as a result of a change in the frequency of the read oscillation only when there is a corresponding zero error (i.e. ~~that is to say~~ when misalignments exist between the stimulating forces/resetting forces/force sensors/taps and the natural oscillations of the resonator). Thus, if a compensation signal that ~~which~~ compensates for the zero error in the read oscillation tapped-off signal caused by misalignments is passed to the input of the rotation rate control loop/quadrature control loop, or directly to the read oscillation tapped-off signal, ~~then~~ the output signal from the rotation rate control loop/quadrature control loop does not change further ~~any more either~~ in the event of a change in the frequency (in particular, a change in the resonant frequency) of the read oscillation. Since the

change in the output signal from the rotation rate control loop/quadrature control loop is recorded by the auxiliary signal, the zero error can be determined and compensated for as follows by controlling the compensation signal so ~~is controlled such~~ that the auxiliary signal (and, thus, the change in the output signal from the control loop) is as small as possible. The frequency (resonant frequency) of the read oscillation is preferably modulated with zero mean value~~,~~ (e.g. ~~for example~~ at 55 Hz).

~~The auxiliary signal is preferably low-pass filtered, and the compensation signal is produced on the basis of the low-pass-filtered auxiliary signal. The compensation signal may be produced, for example, by multiplication of a controlled signal, which is produced on the basis of the auxiliary signal, by a signal which originates from an amplitude regulator for controlling the amplitude of the stimulating oscillation. The auxiliary signal is preferably determined from the output signal from the quadrature control loop, and the compensation signal is passed to the input of the rotation rate control loop.~~

While this invention has been illustrated

with reference to its presently-preferred embodiment, it is not limited thereto. Rather, the invention is limited only insofar as it is defined by the following set of patent claims and includes within its scope all equivalents thereof.

What is claimed is:

~~Patent claims~~

1. A method for compensation for a zero error in a Coriolis gyro (1'), in which:

- the frequency of the read oscillation is modulated,
- the output signal from a rotation rate control loop or quadrature control loop for the Coriolis gyro (1') is demodulated in synchronism with the modulation of the frequency of the read oscillation in order to obtain an auxiliary signal which is a measure of the zero error,
- a compensation signal is produced, and is passed to the input of the rotation rate control loop or quadrature control loop, with
- the compensation signal being controlled such that the magnitude of the auxiliary signal is as small as possible.

2. The method as claimed in claim 1, characterized in that the modulation of the frequency of the read oscillation is a modulation with a zero mean value.

3. The method as claimed in claim 1 or 2, characterized in that the auxiliary signal is low-pass-filtered, and the compensation signal is produced on the basis of the low-pass-filtered auxiliary signal.

4. The method as claimed in claim 1, characterized in that the compensation signal is produced by multiplication of a controlled signal, which is produced on the basis of the auxiliary signal, by a signal which originates from an amplitude regulator for controlling the amplitude of the stimulating oscillation.

5. The method as claimed in one of the preceding claims, characterized in that the auxiliary signal is determined from the output signal from the quadrature control loop, and the compensation signal is passed to the input of the rotation rate control loop.

6. A Coriolis gyro (1'), characterized by a device for determination of the zero error of the Coriolis gyro (1'), having:

- a modulation unit (29) which modulates the frequency of the read oscillation of the Coriolis gyro (1'),
- a demodulation unit (26), which demodulates the output signal from a rotation rate control loop or quadrature control loop of the Coriolis gyro (1') in synchronism with the modulation of the frequency of the read oscillation, in order to obtain an auxiliary signal which is a measure of the zero error, and
- a control unit (28), which produces a compensation signal and passes this to the input of the rotation rate control loop or quadrature control loop, with the control unit (28) controlling the compensation signal such that the auxiliary signal is as small as possible.

ABSTRACT

~~Method for compensation for a zero error in a Coriolis gyro~~

~~In~~ A method for compensation ~~determination~~ of the zero error of a Coriolis gyro. ~~(1'),~~ The frequency of the read oscillation is modulated. The output signal from a rotation rate control loop or quadrature control loop for the Coriolis gyro ~~(1')~~ is demodulated in synchronism with the modulation of the frequency of the read oscillation ~~in order~~ to obtain an auxiliary signal. The auxiliary signal ~~which~~ is a measure of the zero error. A compensation signal is produced and ~~is~~ passed to the input of the rotation rate control loop or quadrature control loop, with the compensation signal being controlled such that the magnitude of the auxiliary signal is as small as possible.

~~(Figure 1)~~